VORTEX GENERATOR rev 2.02

BOM and Build Guide

Very important: The power connector and the Arduino Nano goes of the BACK SIDE (with no silkscreen) as shown in the photos.

BOM Rev 2.02

Resistors (Recommended 1/8W. You can use 1/4W too 1-5% tolerance)

Value	Amt	Designator
100K	x14	R1, R2, R7, R8, R12, R13, R23, R24, R25, R26, R31, R32, R33, R34
1M	x2	R3, R4
10R	x2	R5 R6
1k	x5	R9, R10, R14, R15, R16
47K	x6	R11, R17, R27, R28, R29, R30
10K	x3	R18, R19, R20
4.7k	x2	R21, R22

Caps

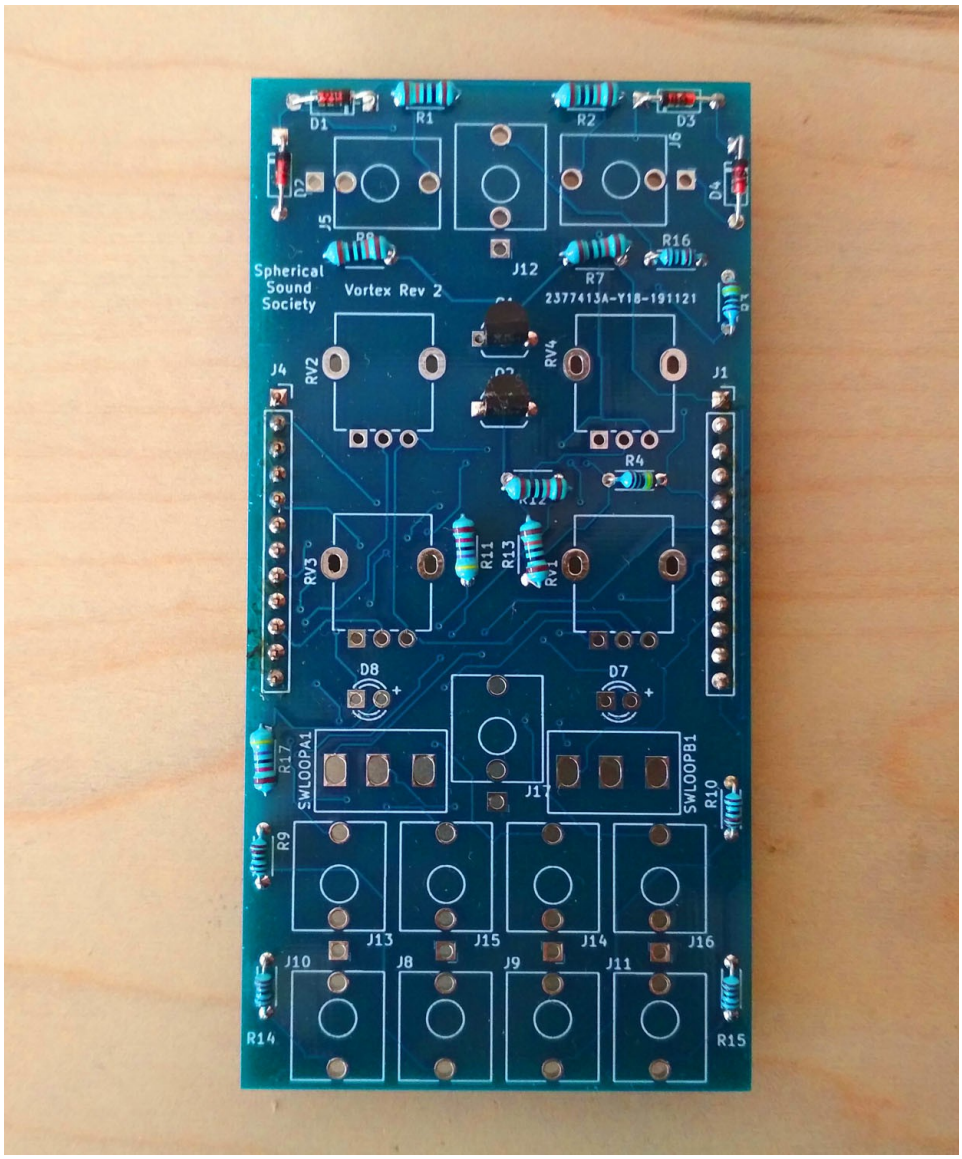
100nF x6	C1, C2, C5, C6, C7, C8 (Ceramic, 20% tolerance, 10nF are valid too, values not critical)	
10uF	x2	C3, C4 (Electrolityc)

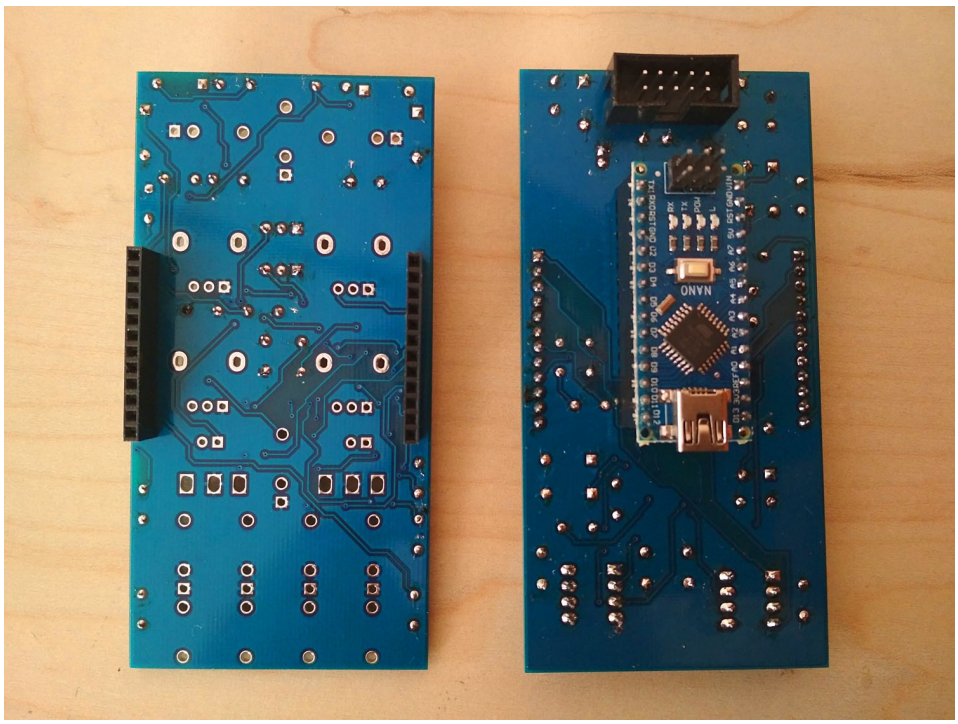
Semiconductors

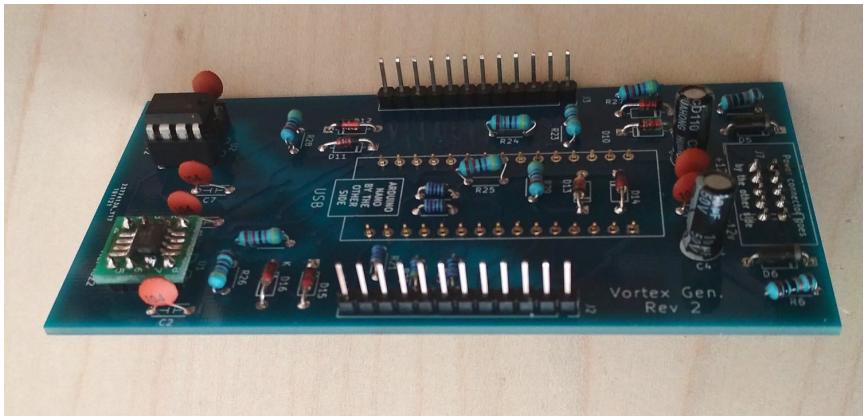
1N4148	x12	D1, D2, D3, D4, D9, D10, D11, D12, D13, D14, D15,D16
2N3904	x2	Q1, Q2
1N4001	x2	D5, D6
TL072x1	x1	U2 (DIP8)
MCP4822	x1	U1 (DIP8)
3mm leds	x2	D7, D8 (Red recommended, change R11, R17 for other colors)

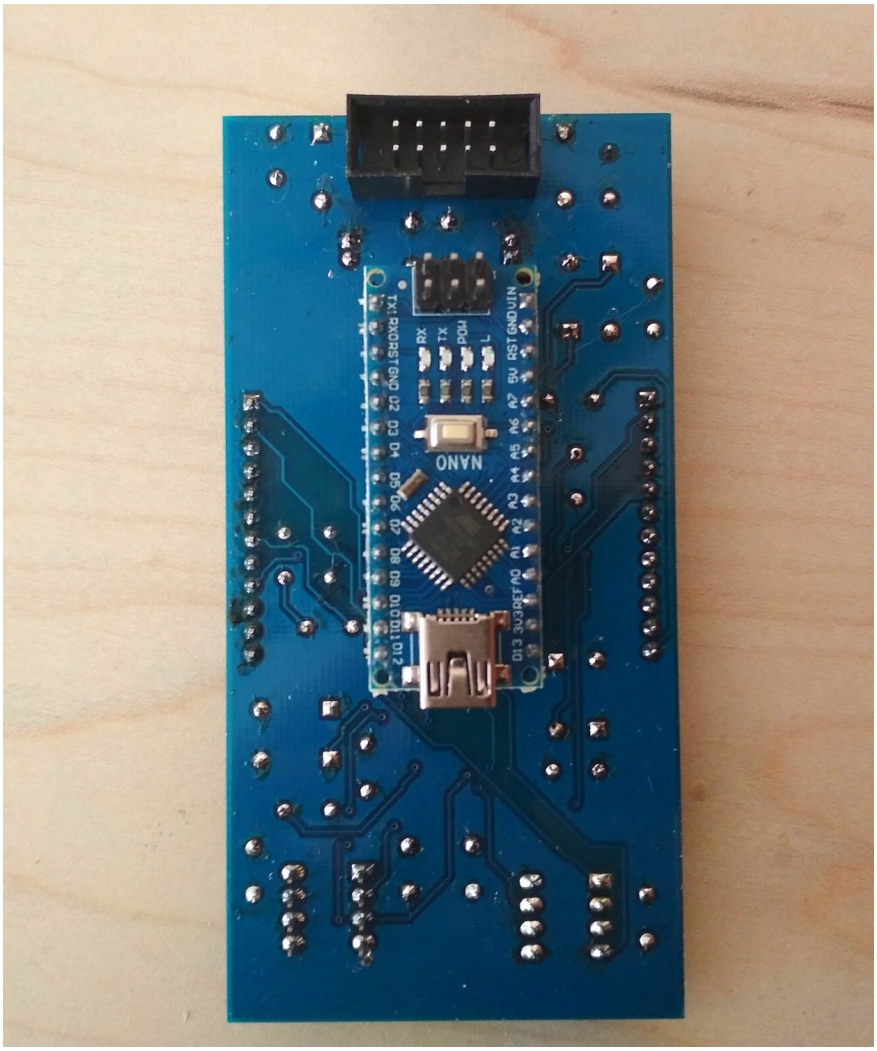
Misc

2x	2x5Pin Power Socket (GOES ON THE BACKSIDE!!)
2x	DIP-8 sockets
2x	1x15 Male Pin strips (arduino pins) (GOES ON THE BACKSIDE!!)
2x	1x15 Female Pin strips (arduino sockets) (GOES ON THE BACKSIDE!!)
2x	SPTD Subminiature ON-ON Switch
12x	Jacks (Thonkiconns)
4x	B10k Vertical Linear pots (any linear pot will work. 10K to 100K recommended)
2x	1x12 Male Pin strips
2x	1x12 Female Pin strips
2x	1x2 Male Pin strips (jumpers)
2x	Juampers
4	Knobs


Spherical
Sound
Society
Vortex Rev 2
2377413A-Y18-191121
D1
R1
R2
D3
D2
D4
J5
J6
J12
R8
R7
R16
J4
J1
RV2
RV4
R4
RV3
R11
R13
RV1
D8
D7
SWLOOPA1
SWLOOPB1
R17
R10
R9
J17
J13
J15
J14
J16
J10
J8
J9
J11
R14
R15


NANO


USB
Vortex Gen.
Rev 2



If you are a seasoned builder, this is more or less all you need to know, but I strongly recommend to use this guides anyway. For newbies, let´s do it step by step:

The order of building is that. Place and solder all the resistors:

100K	R1, R2, R7, R8, R12, R13, R23, R24, R25, R26, R31, R32, R33, R34
1M	R3, R4
10R	R5 R6
1k	R9, R10, R14, R15, R16
47K	R11, R17, R27, R28, R29, R30
10K	R18, R19, R20
4.7k	R21, R22

(Solder all the resistors)

Then, the diodes, minding the polarity

1N4148	D1, D2, D3, D4, D9, D10, D11, D12, D13, D14, D15,D16

The place and solder the ceramic caps:

100nF	C1, C2, C5, C6, C7, C8

(Solder these caps)

Then place and solder the two transistors minding the polarity

2N3904 2 Q1, Q2

Then, the bulky diodes, minding the polarity

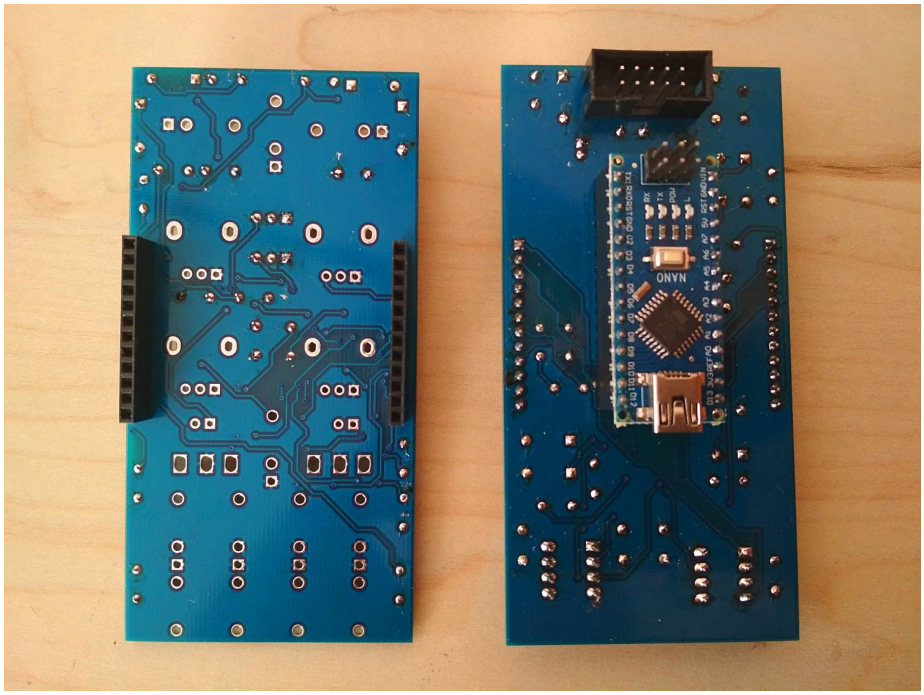
1N4001 2 D5, D6

The place and solder the two electrolitic capacitors mindind the polarity.

10uF 2 C3, C4

(Mind the polarity, solder the electrolitic)

Then, the power connector. Important. It goes by the backside!! (The side with no silkscreen).



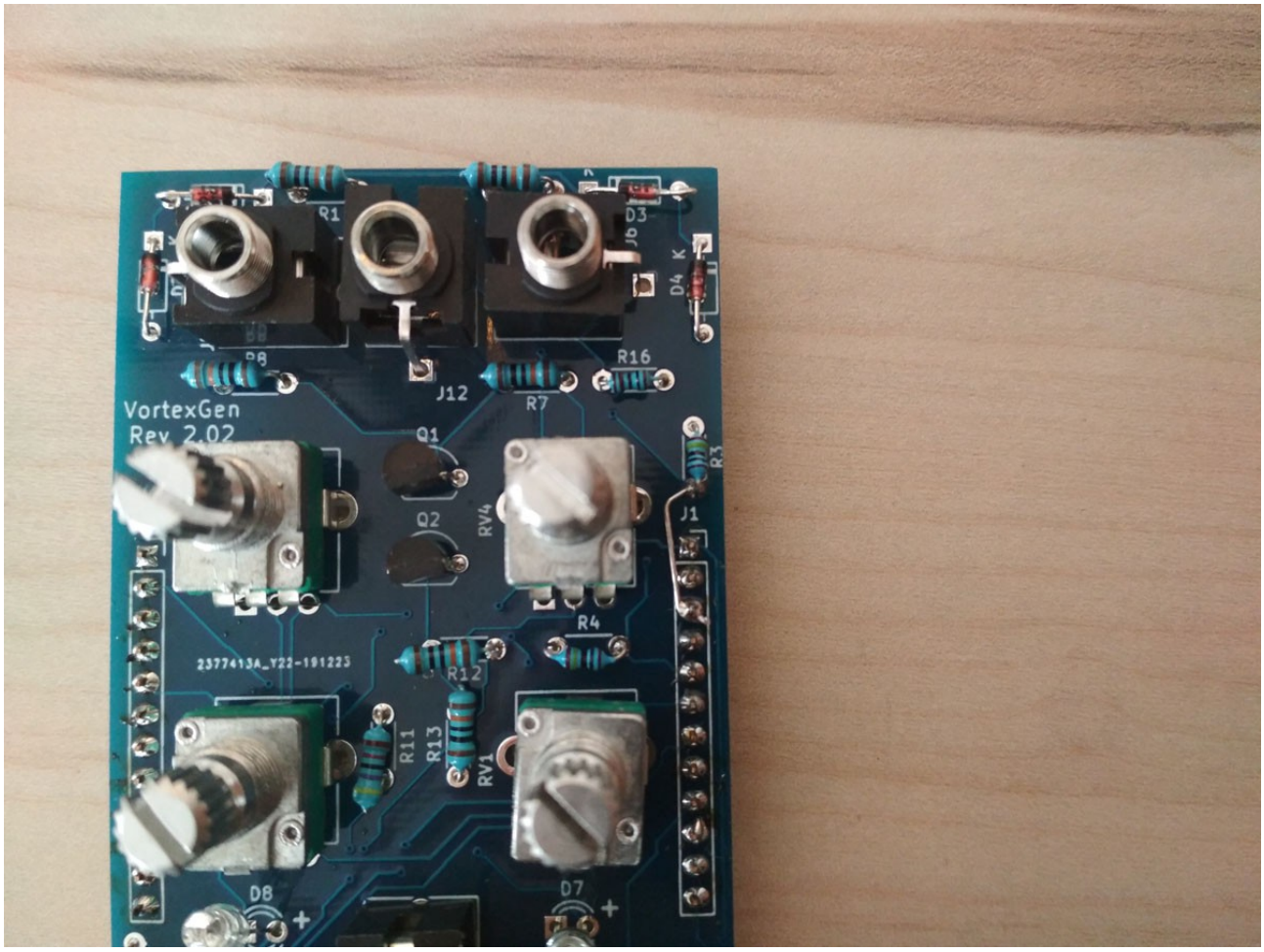
In the silkscreen side there´s market the positive and negative sides for reference

Then, place and solder the chip sockets mindind the polarity

Now place and solder the two arduino male pins BY THE BACKSIDE, taking the photo as reference

Now join the male with the female 12 pins headers. Put the male in the BOTTOM PCB and the female in the TOP PCB as the photos. Keeping then in place, solder the first and the last pin of both male and female sockets. With then in place, solder the rest of them.

Ok. Now it´s time to do a brige. JP1 pin3 should be bridged with R3 lower leg as show in this photo:



THE FRONTPANEL

The next part is critical and takes a good bit of concentration. If you're feeling a bit strained a break would definitely help.

FRONT PANEL COMPONENTS MOUNTING TIPS: Now we will proceed to mount the jacks, potentiometer, switches and LEDs. This part of the assembly is CRITICAL. Please take your time and read the following instructions carefully.

These components must **NOT** be soldered until they are placed on the PCB and fully attached to the front panel.

There are two reasons for this:

• The height of the panel components are not all the same. Because of this, if not attached properly before soldering, they will not stay properly seated against the panel. This might cause mechanical stress reducing their life expectancy and in the worst case cause them to break.

• The second reason is that it is very difficult to align the components to the holes if the panel is not positioned prior to soldering. In the case of the LEDs, they are almost impossible to set to the correct height without reference to the front panel.

Place the mini-jacks on the PCB ensuring they are on the side with the silkscreen but don't solder them until the front panel is in place, with all nuts screwed to it. This way it's easier to solder them in the right position. Keep in mind that the front panel holes are quite narrow and it is almost impossible to place it with all the components already soldered.

The Two last rows of jacks share the same GND connections, so one are facing up and the other facing down (as shown in the photo)

Now place the four potentiometers on the PCB and... don't solder them yet!

Place the switches without nuts and dont solder them yet

Place the LEDs onto the PCB minding their polarity, but don't solder them until the front panel is in place. This is the only way to solder them in the right position. The long leg is the positive and the short the negative. On the PCB the square pad indicates the negative side and there is a + symbol to indicate the positive.

FRONT PANEL

Attach the front panel adjusting the parts one by one if necessary until it fits.
At this point a pair of fine tweezers can be helpful.

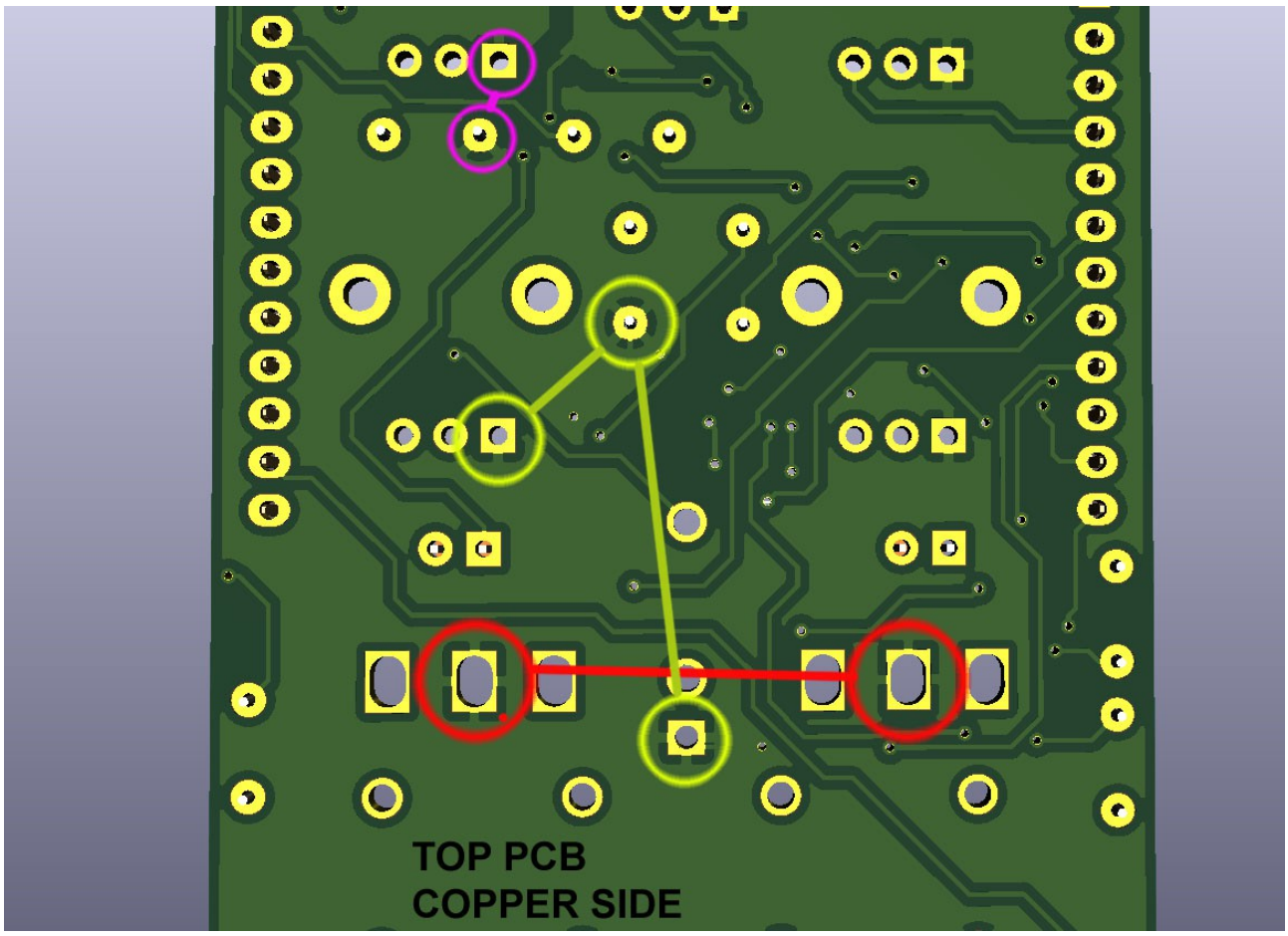
To Finish, screw in the parts in this order:

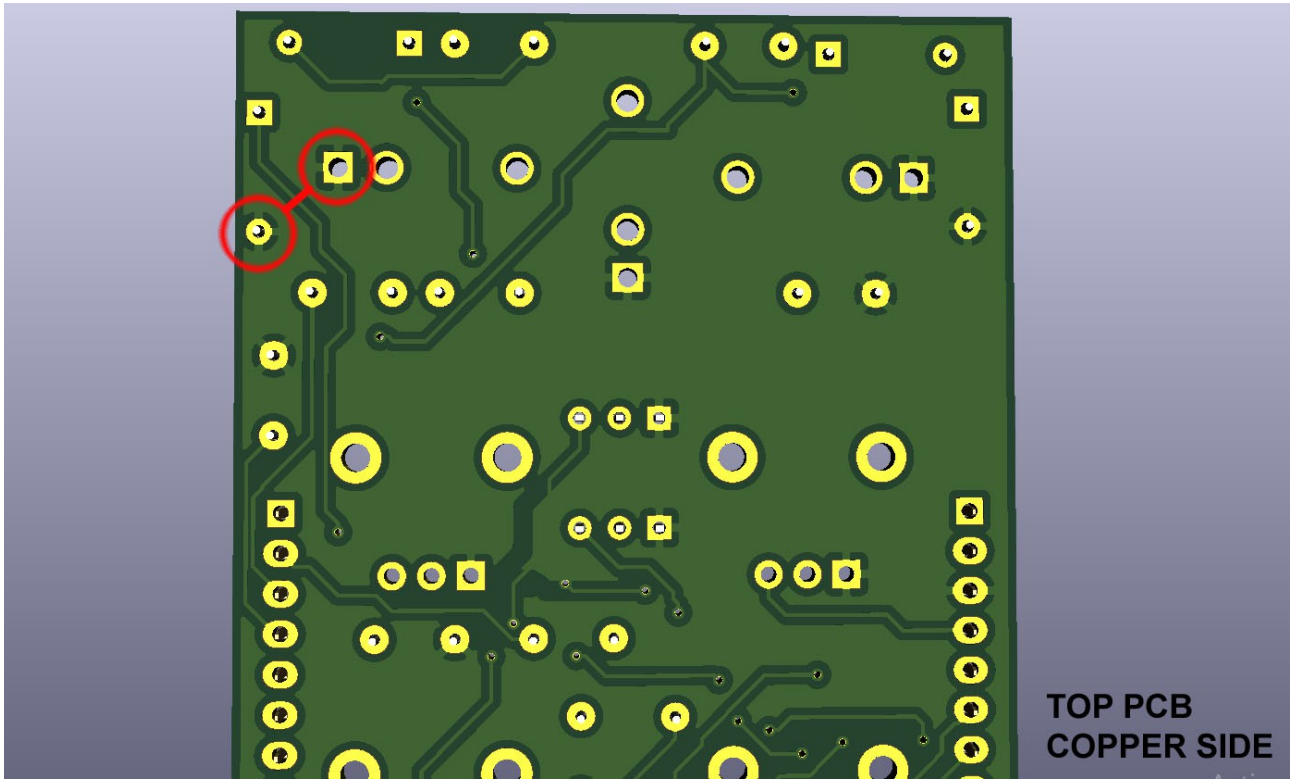
A) Mini-jacks
B) Switches
C) Pots

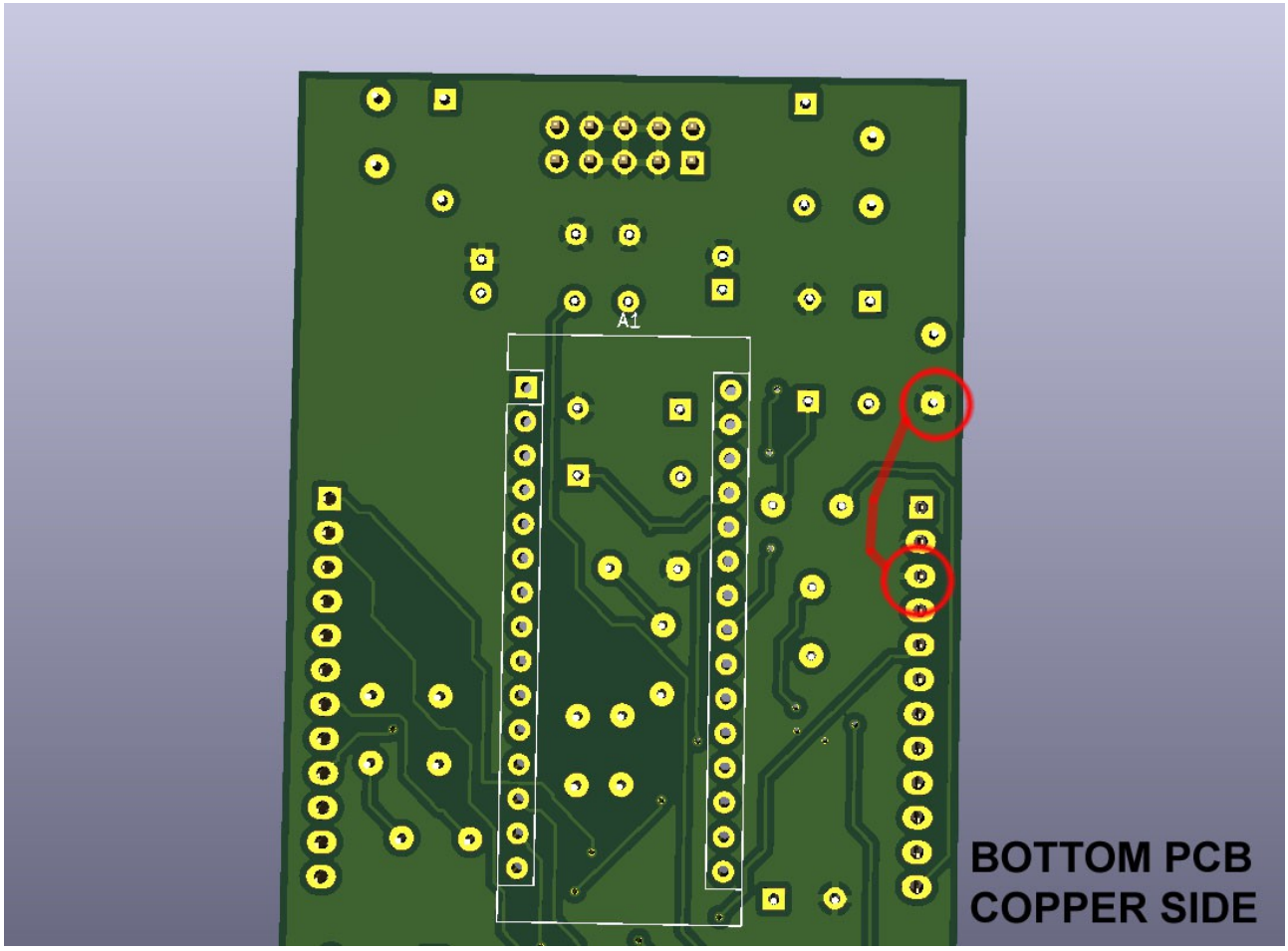
Ensuring all of the above parts are flush with the panel then you can finally solder them!

Next, adjust the LEDs so that they are flush with the panel and solder them.

Rev 2.02 PCBs needs 6 bridges. Use the trimmed legs of the resistors or some wire to bridge it following this schematics:


TOP PCB
COPPER SIDE


TOP PCB
COPPER SIDE


A1
BOTTOM PCB
COPPER SIDE

Finally, there´s 2 jumpers in the bottom PCB. With the jumpers on the output voltage goes from 0 to 4 volts. Without the jumpers it goes from 0 to 8 volts.

When you power the module if the switches are in the left position (looping) it will start autoloop. But note that if you put one chanel in gate mode, for the channels to loop again it needs a gate signal first.

Put the knobs on the potentiometers and YOU ARE DONE.

ENJOY YOUR NEW VORTEX GENERATOR!